## CHAPTER 20 - SUBJECT-MATTER STANDARDS AND STATISTICAL TABLES

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## CHAPTER 20 - SUBJECT MATTER STANDARDS AND STATISTICAL TABLES

This chapter describes the required items for the inventory phase of the Forest Survey. It also includes the formats for statistical tables required as part of all State statistical reports.

Detailed procedures for collecting and processing the data to complete the required statistical tables are covered in chapters 40 and 50. Optional tables and items in standard tables may be included as desired by the Stations and Regions.

The use of --xxx.x in the tables in this chapter indicates that entries should be recorded in the units specified to one decimal place. For example, if the specified reporting unit for an area table was "thousand acres" (--xxx.x) and the actual acreage for a particular item was 150,730 acres it should be shown as 150.7 in the table.

In addition to the 28 tables shown in this chapter, input data for the stand projection program are required for each State. Detailed instructions for preparation of this input are included in chapter 60.

All the following items should be included in State and Regional reports. Exceptions must have Washington Office approval.

# 21 - LAND AREA

21.1 - Land Area Classes. In preparing table 1, data on total area by States and counties published by the Bureau of the Census in its series GS-20 reports should be used, except where prior Washington Office approval has been obtained to use General Land Office area data.

Total land area should be adjusted for changes which have occurred since issuance of official census figures. These changes include creation of water bodies or land areas exceeding 40 acres in area, such as reservoirs or land reclaimed from water area.

Since the Forest Survey minimum areas for land classification differ from Bureau of the Census minimums, the Survey ordinarily classifies as water some areas which the Bureau of the Census includes in its total land area figure. Such areas of water less than 40 acres in extent shall be classified by the Survey as other land and footnoted, as indicated in table 1.

Table 1. -- Area by land classes, (State), 19

Land class	Thousand acres
Forest land:	
Commercial	ninge (Ling) in grown volume omerice4[19 me (Ling) in grown (Babes)
Productive reserved	
Unproductive	
Total	i produce na memori de la produce de la California. La companio de la co
Nonforest land:  Cropland 1/	A CARLES III CART AND
Pasture and range Other—	en la companya di Salah da Majada da Majada La majah da majah da majah da majah da Majada La majah da da da majah da majah da Majada
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<sup>2/</sup> Includes swampland, industrial and urban areas, other nonforest land, and acres, classed as water by Forest Survey standards, but defined by the Bureau of the Census as land. and mismore some of

<sup>3/</sup> Source: United States Bureau of the Census, Land and Water Area of the United States, 19 .

21.2 - Commercial Forest Land, by Ownership Classes. In preparing table 2 if any of the public ownership classes besides National Forest include significant acreages and detailed information is available, show the same information in State reports for these ownerships as required for National Forest.

Forest Survey figures on farmer-owned commercial forest land will differ from the Bureau of the Census figure of woodland on farms for a number of reasons. Forest Survey farmer-owned lands exclude lands leased by farm owners from nonfarmer owners. Census figures include noncommercial forest land and certain Indian lands. Census figures exclude certain farmer-owned forest lands held for nonagricultural purposes and unusually large tracts of forest land in farms.

Lands owned by retired farmers or wives of farmers should be classed as farmer-owned.

In cases where an owner qualifies as both a farmer and an operator of a wood-using plant, or is also a member of another occupational group included with miscellaneous private owners, the ownership should be classed as forest industry if the wood-using operation is of significant commercial importance. (Very small farm sawmills producing lumber only for home use, or mills producing less than 100 M annually, would not be considered of commercial importance.) Otherwise the holding shall be classed as farmer-owned. Under this classification system it is recognized that lands may be classed as forest industry or farmer-owned even though the owner derives most of his income from other sources.

Further classification by ownership size classes—specifically less than 50 acres, 50 to 100 acres, 100 to 500 acres, 500 to 2,500 acres, 2,500 to 5,000 acres, 5,000 to 50,000 acres, and 50,000 acres or more is optional but highly desirable. All tracts held by an owner in the United States should be included in determining size class, although other classifications based on acreages owned in a specified State; for example, also may be used.

Table 2.-- Area of commercial forest land, by ownership classes, (State), 19

Thousand acres
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<sup>1/</sup> Not including thousand acres of farmerowned and miscellaneous private lands leased to forest industry.

## 21.3 - Commercial Forest Land, by Stand-Size and Ownership Classes

Table 3.-- Area of commercial forest land, by stand-size and ownership classes, (State), 19\_\_\_\_

KORS (Thousand acres)

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
Angeles - An Ingles	(xxx.x)	(xxx.x)	(xxx.x)	1	(xxx.x)
Sawtimber stands - / Old-growth Young-growth Total					The state of the s
Poletimber stands	مكمد موسيد المدارة الوادر	August School		: ::::::::::::::::::::::::::::::::::::	angura ar
Sapling and seedling stands	rusuus vasajirimaan 2004 2000 – 2004 – 2004		e in the second of the second		and the second s
Nonstocked areas					<u> </u>
All classes		114 %	mage Government	.7 2 04 0 137T	Hibra Hall

<sup>1/</sup> Breakdown by old and young growth required only in the West.

21.4 - Commercial Forest Land, by Stand-Volume and Ownership Classes. Information in table 4 will permit direct comparisons with older Survey statistics for sawtimber stands classified on the basis of minimum net volumes of 1,500 or 5,000 board feet per acre.

Table 4.-- Area of commercial forest land, by stand-volume and ownership classes, (State), 19

#### (Thousand acres)

Stand volume per acre1/	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)
Less than 1,500 board feet				14.	
1,500 to 5,000 board feet	era, <b>a</b> subjective b		er een oorder oorde	* * *.	
More than 5,000 board feet $\frac{2}{}$				- 1 147 t	
All classes				सार अस्तिक्षेत्रे	

<sup>1/</sup> International 1/4-inch rule.

<sup>2/</sup> Use additional classes where appropriate.

21.5 - Commercial Forest Land, by Stocking Classes Based on Selected Stand Components. Stocking is a measure of the extent to which the growth potential for the site is utilized by trees or preempted by other vegetative cover. Stocking is measured by comparison of basal area and/or number of trees, by age or size and spacing, with specified standards. Basal area per acre provides a measure of stocking for stands with trees 5.0 inches d.b.h. and larger, and numbers of trees per acre for stands with only trees less than 5.0 inches d.b.h.

Basal area standards for the species or types in a Station's area should be based on the best sources of information available, such as normal yield tables or thinning and spacing studies. These standards will be set so that 100 percent is the minimum level of stocking required to make full use of the site. This is the point at which further increases in density would result in no increase in net growth per acre. With the use of normal yield table data, 60 percent of normal is generally considered the minimum level of stocking required to make full use of the site. Stands will be considered overstocked if stocking is 133 percent or more, when 100 percent represents the minimum level of stocking required to make full use of the site.

A cumulative stocking table showing the data in table 5 is desirable but optional.

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Table 5.-- Area of commercial forest land, by stocking classes based on selected stand components, (State), 19

one (Thousand acres) is some thread to continue

Stocking			tocking cla	ssified in te	rms of	
percentage	All trees	Grov	Growing-stock trees		I Rough and	Unhibiting
			(xxx.x)	1	rotten trees	vegetation
160			1301	Discourse de la establica		(
150 to 16 <b>0</b>		ilita teksor t nemili estjet	क पुरास्त्राचाः स्टब्स् ५५%	Winder Diving		
140 to 150		A A STATE OF THE S	ind to the second of the secon			
130 to 140		and the second	in delta et Lesson val			ema jaron
120 to 130						
110 to 120			a in the second		in the Symphetic	a da taran da
100 to 110					e e e tylogen	
90 to 100 😘	. နေ့ နေ့ ညနှ <sup>င်းမ</sup> ှာ		i de Bronza	San San Francis	ณณ (ค.ศ.) สลา เมลา	
80 to 90				•	ba s	
70 to 80			:			-
60 to 70						
50 to 60						
40 to 50						
30 to 40		·				
20 to 30						
10 to 20			<u> </u>			
Less than 10	•					
Total						

21.6 - Commercial Forest Land, by Area Condition and Ownership Classes. In table 6, breakdowns of area condition classes, such as by site, age, and type, may be shown at the option of Stations and Regions.

For purposes of determining area condition class the following stocking classes are used:

- 1. Overstocked--133 percent or more stocking.
- 2. Full stocking--100 to 133 percent stocking.
- 3. Medium stocking--60 to 100 percent stocking.
- 4. Poor stocking--16.7 to 60 percent stocking.
- 5. Nonstocked--Less than 16.7 percent stocking.

Specific criteria for high- and low-risk old-growth stands should be included in western Station and Regional supplements to this section of the handbook. Low-risk stands generally include the relatively thrifty old-growth stands that are still increasing in net volume. High-risk old-growth stands generally have a negative net growth. Subclasses of these two classes might be used to show a "storage stands" category in contrast to "stands in need of salvage cutting to control mortality."

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Table 6.-- Area of commercial forest land, by area condition and ownership classes, (State), 19\_\_\_

#### (Thousand acres)

Area condition class	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)
Class 10 Areas fully stocked with desirable trees and not overstocked.					
Class 20 Areas fully stocked with desirable trees, but overstocked with all live trees.					
Class 30  Areas medium to fully stocked with desirable trees, and with less than 30 percent of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees.					
Class 40  Areas medium to fully stocked with desirable trees and with 30 percent or more of the area controlled by other trees and/or conditions that ordinarily prevent occupancy by desirable trees.					
Class 50  Areas poorly stocked with desirable trees, but fully stocked with growing stock trees.					
Class 60  Areas poorly stocked with desirable trees, but with medium to full stocking of growing stock trees.			,		
Class 70  Areas poorly stocked with desirable trees, and poorly stocked with growing stock trees.					•
Class 80 (West only) Low-risk old-growth stands.					
Class 90 (West only) High-risk old-growth stands.					
All classes				1	

21.7 - Commercial Forest Land, by Site and Ownership Classes. Classification of forest land is based on culmination of mean annual increment of fully stocked natural stands. Yields may be substantially higher under intensive management.

Table 7.-- Area of commercial forest land, by site and ownership classes, (State),

## (Thousand acres)

Site class	All ownerships	National Forest	Other public		Farmer and miscellaneous private
	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)	
165 cu.ft. or more				101 + 3 AS	
120 to 165 cu.ft.	1.12° (		grafikke meta	(1) 14 (1) 14 (1) 14 (1) 14 (1) 14 (1) 14 (1) 14 (1) 14 (1) 14 (1) 14 (1) 14 (1) 14 (1) 14 (1) 14 (1) 14 (1) 14	
85 to 120 cu.ft.			ানু ্ত্রক্তিক	e general gyrje.	
50 to 85 cu.ft.				· 	
Less than 50 cu.ft.					
All classes		·		្លាក់នេះ នៅក្នុងក្រោះ ក្រុមប្រកាសក្រុមប្រកាសក្រុមប្រកាសក្រុមប្រកាសក្រុមប្រកាសក្រុមប្រកាសក្រុមប្រកាសក្រុមប្រកាសក្រុមប្រកាសក្រុមប្រកាសក	
	1 200	·	4.000	ng mark til	Strike 1 in

21.8 - Commercial Forest Land, by Forest Types and Ownership Classes. Forest types shall be determined on the basis of species plurality of all live trees that contribute to no more than 16 percent stocking at a plot point. Mixtures of softwoods and hardwoods shall be designated as hardwood types when the hardwoods in combination represent a majority of stocking.

In addition to the major forest types shown below, significant local types grouped under these major types may be shown in table 8 at the option of Stations and Regions.

Eastern type groups	Western type groups
White-red-jack pine	Douglas-fir
Spruce-fir	Hemlock-Sitka spruce
Longleaf-slash pine	Redwood
Loblolly-shortleaf pine	Ponderosa pine
Oak-pine	Western white pine
Oak-hickory	Lodgepole pine
Oak-gum-cypress	Larch
Elm-ash-cottonwood	Fir-spruce
Maple-beech-birch	Hardwoods
Aspen-birch	Nonstocked
Nonstocked	

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#### FOREST SURVEY HANDBOOK

Table 8. -- Area of commercial forest land, by forest types and ownership classes, (State), 19

(Thousand acres)

	All the second second		
Forest type	All Public ownerships ownersh		Private ownerships
(Show applicable type groups, as listed above.)	(xxx.x)	(xxx.x)	(xxx.x)
All types		esperience in the second	die er geren en er er eg

21.9 - Noncommercial Forest Land, by Forest Types. It is recognized that commercial forest lands, both public and private, may be used for purposes other than timber production, but unless reserved by specific regulation or devoted exclusively to Christmas tree production, such lands should be classed as commercial forest land. In addition to the types specified in the table, other locally significant types may be shown at the option of Stations and Regions.

Table 9.-- Area of noncommercial forest land, by forest types, (State), 19

(Thousand acres)

Туре	All	Productive reserved areas	Unproductive areas
	(xxx.x)	(xxx.x)	(xxx.x)
Forest types:			
(Show applicable type groups listed in section 21.8.)			
Total			
Noncommercial types:		·	
Chaparral			•
Pinyon-juniper			
Other			
Total			
All types			

#### FOREST SURVEY HANDBOOK consecutive and districted cases of

22 - STAND TABLES - GROWING STOCK ON COMMERCIAL FOREST LAND. Number of trees by diameter class is to be shown in table 10 for the appropriate species listed below. This is a minimum list of species for national compilations. Stations and Regions may show additional species of local importance. a trada da a pilo are da are no a figural dia essentiado

Eastern species	Western species
Longleaf and slash pines	Douglas-fir
Shortleaf and loblolly pine	Ponderosa and Jeffrey pine
Other yellow pines	True firs
Eastern white and red pine	Western hemlock
Jack pine	Sugar pine
Spruce and balsam fir	Western white pine
Eastern hemlock	Redwood
Cypress	Sitka spruce
Other eastern softwoods	Engelmann and other spruces
Select white oaks 1/	Western larch
Select red oaks 2/	Western redcedar
Other white oaks	Incense-cedar
Other red oaks	Lodgepole pine
Hickory	Other western softwoods
Yellow birch	Cottonwood and aspen
Hard maple	Red alder
Soft maple	Oak
Beech	Other western hardwoods
Sweetgum	
Tupelo and blackgum	
Ash	
Cottonwood and aspen	
Basswood	
Yellow-poplar	
Black walnut	
Other eastern hardwoods	

<sup>(</sup>Q. alba, Q. michauxii, Q. muehlenbergii, Q. durandii, Q. bicolor, and Q. macrocarpa).

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March 1967

<sup>2/ (</sup>Q. rubra, Q. falcata var. pagodaefolia, and Q. shumardii). TOPI HOTSEN

Table 10.-- Number of growing stock trees on commercial forest land, by species and diameter classes, (State), 19

Diameter:class (Inches at breast height) All . 5.0-7.0-Species: 11.0- 113.0- 15.0-7.0 9.0 lasses Softwoods: (Show applicable species as listed above.) Total Hardwoods: (Show applicable. species as listed above.) Total All species

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Volume estimates should include the volume of sound wood only. Include breakage as part of logging residues. Gross volumes may be estimated at the option of the Stations and Regions.

Estimates of timber volumes on productive forest land reserved from commercial timber use ordinarily will not be compiled. Permission of appropriate officials shall be obtained prior to publication of volume data for reserved areas.

Estimates of additional volumes on unproductive forest land are desirable, but optional.

#### 23.1 - Timber Net Volume, by Timber Class

Table 11.--Net volume of timber on commercial forest land, by class of timber, and softwoods and hardwoods (State), 19\_\_\_\_\_

#### (Million cubic feet)

Class of timber	All species	Softwoods	Hardwoods
	(xxx.x)	(xxx.x)	(xxx.x)
Sawtimber trees: Saw-log portion Upper-stem portion		. इसे व्यक्तिक विकास	esagoldusia subat. Ni
Total Poletimber trees			
All growing-stock trees	-		
Rough trees			
Rotten trees	,		
Salvable dead trees			
Total, all timber			

23.2 - Growing Stock and Sawtimber Net Volume, by Ownership Class. In view of the local use of log rules other than the International 1/4-inch rule, Forest Survey reports should include conversion factors relating International 1/4-inch rule to Scribner or other appropriate rules. Volume statistics in terms of locally important rules in addition to the International 1/4-inch rule may be reported at the option of Stations and Regions.

Table 12.-- Net volume of growing stock and sawtimber on commercial forest land, by ownership classes, and softwoods and hardwoods, (State), 19\_\_\_\_\_

Ownership class	(Mill	owing stock ion cubic fe	eet)	Sawtimber (Million board feet)			
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods	
	(xxx.x)	(xxx.x)	(xxx.x)		(xxx.x)	(xxx.x)	
National Forest	Same and Mile	•	1 '	r socrate			
Other public		ให้สาร์การ และไป	,				
Forest industry	e e e e e e e e e e e e e e e e e e e	er oak toetaan diga suna	State to common you be common restrict an angular	NO THE STATE OF THE PROPERTY PROPERTY SHOULD BE SHOULD SHOULD BE S	er se belagera gymna-strassagara viltalar		
Farmer and miscellane- ous private			·		3(1)		
All ownerships	in James en man	posto grando legida.	Miller 2 gyrthanolog aming afri	namakis sasiya Wana kadabahan aya netirina	ne sangguesam nega pipi sangguesam bendup		

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					~~ <u>\$</u>	inista)
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ar to a contract a programme and a contract to the contract to	سيدان ومورونيون بأحراب والمتعاومة والم		and the second second			

23.3 - Growing Stock Net Volume, by Species and Diameter Classes. See section 22.1 for species list. Add other locally important species.

Table 13. -- Net volume of growing stock on commercial forest land, by species and diameter classes, (State), 19

				( N	fillion cub	ic feet)	5		والمنطقة المنطقة المنطقة	بالمراجعة المستشير	
			<i>i</i> .	Diameter o	class (Inch	es at brea	st height)	***************************************			
Species	All classes	5.0- 7.0	7.0-	9.0- 11.0	11.0-	15.0	15.0- 17.0	17.0- 19.0	19.0-		29.0 and larger
	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)	(xxx,x)	(xxx.x)	(xxx, x)
Softwoods:				İ							resorts.
(List species)				i							
Total					man independent of			• • • • • • •		- '	
Hardwoods: *	a electrical and the	om og a handla i fings	i newsers and pro-	! parestatuisee ett	rankriji sijisti ili ku irrisi	i Januar <del>ia</del> i grafia a seri (1).	aga ayab sa q	Simplescopy (Language	p p - marterais	e sent.	
(List species)			i :			:					20
Total									er ceina	الإنتان المستناد	أحمدته والإيوادات
Total all species		20.000000	le de la composition		o parato por o	may the defined the design	politic personal designation of		and the State of States	Property of St.	#854 G .
				:							

23.4 - Sawtimber Net Volume, by Species and Diameter Classes.

See section 22.1 for species list. Add other locally important species.

Table 14.--Net volume of sawtimber on commercial forest land, by species and diameter classes, (State), 19

#### (Million board feet)1/

		Diamete	er class (Tr	iches at hr	esst haight	٠.		
All classes	9.02/ 11.02/	11.0- 13.0	13.0- 15.0	15.0- 17.0	17.0- 19.0	19.0- 21.0	21.0-	29.0 and
(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x)	(xxx.x
	n i e dan igi	regular je uzbalu.	ation of artist or pro-	, ondokan vid	ude in propulsion state.	survey of the least	Section of the sec	
			-					والمراجعة والراجعي
, , , , , , , , , , , , , , , , , , ,	المنافسات المجهي							N' Estro
	a discount of the second							
. Bud ( ) June	in a section of the s				A COLUMN TO A SERVICE CONTRACTOR OF THE COLUMN TO THE COLUMN TO THE COLUMN THE COLUMN TO THE COLUMN TO THE COLUMN THE COLUMN TO THE COLUMN THE	entralización de proprio de la composición del composición de la composición de la composición de la composición del composición de la composición del composición de la composición del c	ngan mada nganggang and maganin maganin mada panggang	
	classes	11.0 <sup>2</sup>   (xxx.x)   (xxx.x)	All 9.02/ 11.0- 13.0 (xxx.x) (xxx.x)	All 9.02/ 11.0- 13.0- 15.0 (xxx.x) (xxx.x)	All classes 11.0-/ 13.0 15.0- 17.0 (xxx.x) (xxx.x) (xxx.x)	All classes 11.0-/ 13.0 15.0- 17.0- 19.0 (xxx.x) (xxx.x) (xxx.x) (xxx.x)	classes 11.0 <sup>2</sup> / 13.0 15.0 17.0 19.0 21.0 (xxx.x) (xxx.x) (xxx.x) (xxx.x) (xxx.x)	All (-10.0 11.0 13.0 15.0 17.0 19.0 21.0 29.0 (xxx.x) (xxx.x) (xxx.x) (xxx.x) (xxx.x) (xxx.x) (xxx.x)

<sup>1/</sup> International 1/4-inch rule.

<sup>2/</sup> Softwoods only in States other than California, Oregon, Washington, and coastal Alaska.

23.5 - Sawtimber Net Volume, by Species and Quality Classes.

Since crews will only grade the first saw log in each live sawtimber tree, volumes by log grade for entire trees must be estimated by applying the results of special studies that relate the grade of the butt log to the grades of the remaining saw log portions. Special log grade study procedures should be included in Station Supplements to section 47.9.

Tables showing volumes of the graded butt logs only, by quality class and by species or species group, may be prepared at the option of the Stations and Regions.

Show quality class data in table 15 by the following species or species groups:

Eastern species or species group	Western species or species groups
Softwoods:	Douglas-fir
Yellow pines	Ponderosa and Jeffrey pines
Eastern white and red pines	Western white and sugar pines
Spruce and balsam fir	Western hemlock
Other eastern softwoods	True firs
•	Redwood
هر لافتيار ومر معتقد معتبر من معتبر المراج والمعتبر المعتبر المعتبر المعتبر المعتبر المتناز المتناز المراج الم	Spruce
	Other western softwoods
	Western hardwoods
Hardwoods:	1000 · 1
Select white and red oaks  (Q. alba, Q. michauxii, Q. muehlenbergii, Q. durandii, Q. bicolor, Q. macrocarpa, Q. rubra, Q. falcata var. pagodaefolia, and Q. shumardii)	
Other white and red oaks	
Hickory	
· Yellow birch	
Hard maple	
Sweetgum	
Ash, walnut, and black cherry	
Yellow-poplar	
Other hardwoods	

Table 151	let volume of sawtimber on commerce	ial
forest land	, by species and quality classes,	4.7.7
(State), 19	្រុសទៅលើសារអនុគ្នា ស្ទាប់ ប៊ីសព្វសម៌ម ស្គុណ កាយ ខ្លឹងការធ	6.60

(Million board feet) 1/ party and a

Species	Quality classes					
	All classes	(Specify log or tree grades used)				
	(xxx.x)	(xxx.x)				
Softwoods:		in de filo dello e ode emelle motoliko. Periodo				
(Show applicable species listed above.)						
Total		a a a a a a a a a a a a a a a a a a a				
Hardwoods:	n nes salvenes L	tilaszálá, kozaszájá				
(Show applicable species listed above.)						
Total	) single					
	Section 1					

<sup>1/</sup> International 1/4-inch rule.

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n sigóge e esiádião no monte de se

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24 - TIMBER GROWTH AND TIMBER REMOVALS. The components of net annual growth of growing stock are (1) the increment in net volume (after allowances for defect) of trees in the growing stock at the beginning of the specified year and surviving to its end (survivor growth); plus (2) the increment in net volume of trees in the growing stock at the beginning of the year that were cut, died, or became culls during the year; plus (3) the net volume of trees that grew into growing stock during a specified year (ingrowth); minus (4) the net volume of trees in the growing stock that died from natural causes (annual mortality); minus (5) the net volume of trees in the growing stock that became rough or rotten trees during the year.

Estimates of net annual growth should be for a specified survey year, based on average or trend rates of diameter growth and mortality. Diameter growth rates may be determined from increment cores for new plots or from changes in d.b.h. between inventories.

Information on timber removals also should ordinarily be shown for a specified Survey year, but the average removals for a period of years may be used if considered more representative of the trend level of cutting.

Average levels of growth and removals should be determined for the period between successive inventories so that initial inventory plus net growth between surveys minus total removals between surveys equals second inventory. Estimates of growth and removals for a specified survey year should be consistent with the average levels of growth and removals that must have occurred during the period between surveys.

Information on timber growth and timber removals should be shown for growing stock in cubic feet and for sawtimber in board feet. Other tabulations in cords or other units of measure are optional.

## 24.1 - Annual Net Growth and Removals of Growing Stock, by Species

Table 16.—Net annual growth and removals of growing admiss stock on commercial forest land, by species, first and (State), 19 year the sale against an annual growth and growing and the sale against the sale aga

## of medical transfer of thousand cubic feet) with a majorant could write the same terms of the same and the same terms in the same and the same terms in the same terms of the

Species		Annual timber removals
Softwoods:  (Show species or species groups listed in section 23.5.)	ng Allest (M. 1944) Mili (M. 1944) VIII (1944)	្រៃ ឬ ២៦១ ខាងនេះមេនិសា ( ស្រាយមាន ១១៤, ១៣ ខេត្តពី
Total Hardwoods:		
(Show species or species groups listed in section 23.5.)	randa e include de la compansión de la comp Compansión de la compansión de	vora in edelati, eda en e Deltael bosa en en us me me
Total All species		

ន្ទី២០ ស្តីស្លាក់ ស្រាស់ ស្រាស់ ស្រាស់ ស្រាស់ ស្រាស់ ស្រាស់ ស្រាស់ ស្តី ស្តី ស្តី ស្តី ស្តី ស្រាស់ ស្រាស់ ស្រា ស្រាស់ ស្រាស

## 24.2 - Annual Net Growth and Removals of Growing Stock, by Ownership Classes

Table 17.--Net annual growth and removals of growing stock on commercial forest land, by ownership classes, and softwoods and hardwoods, (State), 19

(Thousand	cubic	feet\

Ownership	Net	annual gro	owth	Annual removals			
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods	
National Forest			. ;	111 TO 4.	i .	12 and 1	
Other public					is to		
Forest industry	Artist to the second	gang ting gather in the gath BM M date o					
Farmer and miscellane- ous private	The second of th	n gan di gentle e et i i i i i i i i i i i i i i i i i				-	
All ownerships					, 143		

#### 24.3 - Annual Net Growth and Removals of Sawtimber, by Species

Table 18.--Net annual growth and removals of sawtimber on commercial forest land, by species, (State), 19

(Thousand board feet)

Species	Net annual growth	Annual
Softwoods:	i gazenia Biliteri Singata di Sessioni di Sali	
(Show species or species groups listed in section 23.5.)		
Total		
Hardwoods:	and the second s	**************************************
(Show species or species groups listed in section 23.5.)	Contract Con	
Total		
All species	· ·	

l/ International 1/4-inch rule.

## 24.4 - Annual Net Growth and Removals of Sawtimber, by Ownership Classes

Table 19. -- Net annual growth and removals of sawtimber on commercial forest land, by ownership classes, and softwoods and hardwoods, (State), 19

Charles 197 - (Thousand board feet) 1/010 7/2 1971 1971

	a, in the Ne	t annual gr	owth. : : : : : : : : : : : : : : : : : : :	20:00 Annual removals for		
Ownership	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
National Forest	The same of the sa	Company (September 1877)	to the transfer of the same of	Ages or supplement of the supplement of the	and the property and the	- Furget Free States
Other public						·
Forest industry	- marriagata es Crestra pe a acadit	and the state of the contract of				
Farmer and miscellane- ous private			in the second	erge Grand de la companya br>De la companya de la	sa tiji saga	ragas salas administrativos es
All ownerships					i sa	second of

*					الراء الافتور والمحاد فيرفع المناهر المحادد الما
1/. 7	•				The second secon
1/ International 1/4-inch	rule.				er and the state of the second
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					and the state of
				*	
					d, svigharu
المعلقة المحاولة المحافظة المراوية المن والمعلوم والمنظوم والمنظوم والمحافظة والمحافظة المحافظة المعافظة المعا المحافظة المحافظة المنظمة الم	e elementario e el Peres.	established to the confidence of	القابرا الأنوان فراحها والتغليب فيدعون		
	•				
And the country of the amount of the country of the	Markova vijeka je dana kajan kanaka i maja vijeka ka	Harani in ann de <del>isea</del> den garige in	of the second se		Laber Committee Committee
المعالجة المعلق فيونون المعارضية والمعارضية والمعارض المعارض المعارض والمعارض والمعارض المعارضة المعارضة المعا - المعارضة المعارضية المعارضية المعارضية والمعارضية المعارضية المعارضية المعارضية المعارضية المعارضية المعارضي	Fig. 1. The Francis Company of the Section 1991	especto protoporensi selati filis	, mest, some historians appropriate	A CONTRACTOR OF THE CONTRACTOR	
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				*** Y.	<del>, e</del> ngles in the first of the
				\$1.5 <u></u> \$51.6.1	
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				100	
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100 100 control of the Section of th	Committee to a construct the construction		Magazinti ratuur kijirista ya ingatita ya sasaniya a sasani Bensan ya ingazini ingazini ya ya sasaniya ya sasaniya sa		
		•			
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The first community of purchase and a superior and the first superior and the superior and	The state of the same of the s	ويعينها الدائد يوجو البيون يعاطانهم	المستحد وما للمطاء الأدامين المستحد	Andrew Control	and the second of the second

25 - TIMBER MORTALITY ON COMMERCIAL FOREST LAND.

Estimates of annual mortality for a specified survey year should be based upon average or trend rates of loss, computed from dead trees tallied on remeasured plots or during a period of 1, 3, or 5 years immediately prior to field work on new plots. Trend level mortality should include both occasional and unusual or catastrophic losses from fire, insects, etc.

Total mortality should be determined, if feasible, although it is recognized that where dead trees are promptly salvaged field observations may indicate only unsalvaged mortality.

### 25.1 - Growing Stock and Sawtimber Mortality, by Species

Table 20.-- Mortality of growing stock and sawtimber on commercial forest land, by species, (State), 19

		and the state of t
Species	Growing stock (Thousand cubic feet)	Sawtimber (Thousand board feet)
Softwoods:	the equal transfer for the following of the state of the	्राच्याः स्टब्स्य स्
(Show species or species groups listed in section 23.5.)		e o to constitut ( to temperature to the sec
Total		10 <u>-</u>
Hardwoods:		
(Show species or species groups listed in sec- tion 23.5.)		
Total		
All species.		

<sup>1/</sup> International 1/4-inch rule.

## 25.2 - Growing Stock and Sawtimber Mortality, by Ownership Classes

Table 21. -- Mortality of growing stock and sawtimber on commercial forest land, by ownership classes, and softwoods and hardwoods, (State), 19

Ownership	(Thou	sand cubic	feet)	(Thousand board feet)		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
National Forest	35 .	-purebil	TINE, YO		184 S. L. B.	12041
Other public	n da 11	12/30 / Tel		ma lesse (ma		
Forest industry	1 12.0	Systematic		i estate	. Special	
Farmer and miscellane- ous private	رَّ شد دور ا			i ey e i du e e e tari Ziree	a periodica. Esperage	
All ownerships						
e e e e				-		

<sup>1/</sup> International 1/4-inch rule.

25.3 - Growing Stock and Sawtimber Mortality, by Causes. Further breakdowns of causes of mortality are desirable, but optional. Thus, losses from specific causes, such as little-leaf disease or southern pine beetle, may be indicated.

Since it is difficult or impossible in many cases to establish a single cause of death, or to identify the primary and secondary causes of death, show combinations of causes, such as fire and insects, when appropriate.

Detailed local criteria for identification of causes of mortality should be developed in cooperation with other research projects.

Table 22.-- Mortality of growing stock and sawtimber on commercial forest land, by causes, and softwoods and hardwoods, (State), 19

Cause	(Thous	rowing stoc sand cubic		(Thousand board feet)			
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods	
Fire							
Insects							
Disease					-		
Other							
Unknown							
All causes							

<sup>1/</sup> International 1/4-inch rule.

26 - TIMBER PRODUCTS OUTPUT. Information on production of timber products obtained by the Bureau of the Census should be used when available and suitable. Where census data are inadequate for Forest Survey purposes, cooperative surveys with the Bureau of the Census or other agencies should be developed when feasible. Other sources of information include stump measurements on sample locations and special surveys of wood-using plants or logging operations.

## 26.1 - Timber Products Output, by Products and Source of Material

Table 23. -- Output of timber products, by source and asset of material and softwoods and hardwoods, (State), 19 4 role er al révolut a romans rolantes librossi THE BETTER THE SECOND SECTION OF THE SECOND SECURITIES OF SECOND SECTION OF THE SECOND SECTION OF THE SECOND SECURITIES OF THE SECOND SECTION OF THE SECOND 
Product and	Standard	Tota	loutput	Roundwoo	od products	Plant byproducts		
species group	units	Number of units	Thousand cu.ft.	Number of units	Thousand cu.ft.	Number of units	Thousand cu.ft.	
logg.								
Saw logs: Softwood	M bd.ft.1/ M bd.ft/							
Hardwood		ļ				<del> </del>	!	
Total	M bd.ft/							
Veneer logs				1	ł		1	
and bolts:	1/	ŀ	1				l	
Softwood Hardwood	M bd.ft. 1/ M bd.ft	1						
Total	M bd.ft1/							
Pulpwood: Softwood Hardwood	Std. cords 2/ Std. cords					-		
Total	Std. cords 2/							
Iotai	BEG. COTAS					<del>                                     </del>		
Cooperage:	M bd.ft.1/							
Softwood Hardwood	M bd.ft.							
Total	M bd.ft. $\frac{1}{}$							
			-					
Piling: Softwood	M linear ft.						1	
Hardwood	M linear ft.	<u> </u>		<del> </del>	ļ	ļ	<u> </u>	
Total	M linear ft.	ļ						
Poles:								
Softwood	M pieces	1						
Hardwood	M pieces			İ				
Total	M pieces	+						
Mine timbers (Round):		1						
Softwood	M cu.it.							
Hardwood	M cu.ft.	<del>                                     </del>	-	-	-	-		
Total	M cu.it.					-		
Posts (Round						.		
and split): Softwood	M pieces				1 .			
Hardwood	M pieces			-	-		<b></b>	
Total	M pieces							
Other $\frac{3}{}$ :			]				1	
other :	M cu.ft.						-	
Hardwood	M cu.it.		-	-			<del> </del>	
Total	M cu.ft.	+		_	<del> </del>		-	
Total industrial products: Softwood								
Hardwood Total		+	1	<u> </u>		1		
•								
Fuelwood: Softwood	Std. cords							
Hardwood Total	Std. cords	+ .	+		+	<del> </del>	+	
IUGI	3.0.0145	-		-				
All products: Softwood Hardwood		-	,					
Total				ļ			.	

I/ International 1/4-inch rule.
 Rough-wood basis (Include chips converted to equivalent standard cords).
 Includes hewn ties, excelsior bolts, shingle bolts, turnery bolts, and chemical wood.

### 26.2 - Roundwood Products Output by Products and Source

Table 24. -- Output of roundwood products by source, and softwoods and hardwoods, (State), 19

and the state of the second second second second	All Growing stock trees 1/			Rough	Salvable ,,	Other 2/		
	Product and species group	sources		Sawtimber		rotten trees_/	dead tree=1/	sources_/
فيتناه الماليا المتعالمة	Industrial products:	arphropage o'Lan arb. To		THE RESIDENCE OF THE	Transce Contractor		were a reserve and resident	***
٠	Saw logs: Softwood Hardwood Total				\$	2,44	e e e e e e e e e e e e e e e e e e e	¥.
<b>V</b>	Veneer logs and bolts: Softwood Hardwood Total		-	-				
	Pulpwood: Softwood Hardwood Total					- 11		
	Miscellaneous industrial products: Cooperage: Softwood Hardwood Total	-				. N		
ta makanany is nyimma da T	Piling: Softwood Hardwood Total	* 1					typerkeli Lange M	
e german, sen men er en	Poles: Softwood Hardwood Total	1722. \$21.	u o skoli		2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	Mine timbers (Round); Softwood Hardwood Total			-		- 1		
Programa di Teodo Lorga	Posts (Round and split): Softwood Hardwood Total	vio atte	2000			- 4° - 1		
	Other: Softwood Hardwood Total							
	All miscellaneous industrial products: Softwood Hardwood Total							
	All industrial products: Softwood Hardwood Total							
	Fuelwood: Softwood Hardwood Total							
	All products: Softwood Hardwood Total				,			

 <sup>1/</sup> On commercial forest land.
 2/ Includes trees less than 5.0 inches in diameter, tree tops and limbs from commercial forest areas or material from noncommercial forest land or nonforest land such as fence rows or suburban areas.

#### 26.3 - Growing Stock Timber Removals by Items

Table 25.--Timber removals from growing stock on commercial forest land, by items, and softwoods and hardwoods, (State), 19

(Thousand cubic feet)

Item	All species	Softwoods	Hardwoods
Roundwood products:		12 (2) (2) (2) (2) (2) (2) (2) (2) (2) (2	·
Saw logs Veneer logs and bolts Pulpwood Cooperage logs and bolts Piling Poles Mine timbers		in the state of th	
Posts Other Fuelwood		in interest value en la companya de value de deservidades	
All products		. १८४ <b>८</b> -८४ हा ही । १.४८४	
Logging residues		प्रवस्तात्वकार्यक्रम् १९०४मध्यः <u>वि</u>	
Other removals		The second secon	
Total removals	-	us en payer u	
,			

#### 26.4 - Sawtimber Removals by Items

Table 26.--Timber removals from live sawtimber on commercial forest lands, by items, and softwoods and hardwoods, (State), 19\_\_\_\_\_(Thousand board feet) 1/\_\_\_\_\_\_

Item	All species	Softwoods	Hardwoods
Roundwood products:		. 18	
Trouble products.		* 1	
Saw logs			, -
Veneer logs and bolts Pulpwood	Constitution and a second second		
Cooperage logs and bolts			
Piling			
Poles Mine timbers			
Posts			a a 2000.
Other		·	
Fuelwood			197 <b>4</b>
All products			
Logging residues			
		e y e amiliani.	
Other removals			
Total removals			#
and the second s			

<sup>1/</sup> International 1/4-inch rule.

### 26.5 - Unused Residues Volume by Industry and Type of Residue

Table 27. -- Volume of unused residues at primary manufacturing plants, by industry and type of residue, and softwoods and hardwoods, (State), 19\_\_\_\_\_\_

			•	
Species group and type of residues	All industries	Lumber	Veneer and plywood	Other
Softwoods:	alpoint gas gasting for expect of committee of the late.	The section of the section	and the second s	, was pro-
Coarse_1/			Training of Gradien	
$Fine \frac{2}{}$		• •		
Total			* 17 13	
Hardwoods: Coarse— Fine—  /			18 to 18 (18 )	
Total				
All species:			्य कर केंग्नी के स्ट्राय	
Coarse—1/	:		i ku kutatan et Kutatan eti	. data
Fine <sup>2</sup> /			e Egympatria (1967) Partina de la companya (1967)	
Total		e o a sellence in our come.	and the second s	Suppression of the Control of the Co
			and the second second second	

<sup>1/</sup> Material, such as slabs, edgings, and veneer cores.

Explanation: Determination of volumes of unused plant residues produced in secondary manufacturing industries is optional.

Z/ Material, such as sawdust and shavings.

## FOREST SURVEY HANDBOOK TOTAL TOTAL

- PROJECTED TIMBER GROWTH AND CUT. Assumptions used making these projections should be clearly stated, including asmed trends in forestry programs and other relevant factors, such projected land clearing or reversion to forest. Calculations ould assume that available cut and growth will be in balance at end of 30 years.

Table 28.--Projections of net annual growth, available cut and inventory of sawtimber and growing stock on commercial forest land, (State), 19

:ies		·Growing (Thousand	stock cubic feet)				mber	
dnc	19_ (Inventory year)	(Inventory year plus 10 years)	(Inventory year plus 20 years)	(Inventory year plus 30 years)	19_ (Inventory year)	(Inventory year plus 10 years)	(Inventory yea plus 20 years	r(Inventory year) plus 30 years)
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28 - FOREST TYPE MAPS. A generalized forest type map on a scale of 1:2,500,000, or approximately linch equals 40 miles, may be included in each State or subregion Forest Survey report. Any area of at least 100 square miles having 10 percent or more of forest land should be shown; smaller areas may be shown at the Stations' discretion. Narrow stringers of forest, as along river bottoms, may be shown diagrammatically.

Detailed forest type maps, at scales of l inch equals l mile, for example, ordinarily should not be prepared by the Survey, unless financed wholly or to a major degree by cooperative funds, or unless preparation of detailed type and stand-size class maps is an integral part of an approved Forest Survey plan.

28.1 - Cover Type Groups. Forest cover type groups listed below, or significant local cover types keyed to these groups, shall be used. All type maps should be printed with colors as specified.

Productive forest land reserved for nontimber purposes should be indicated by vertical hatching over type colors.

28.11 - Eastern

Cover type groups	Color	GPO ink number—/	Crayon 2/ number_/
White-red-jack pine	Brown	173	343
Spruce-fir	Slate grey	189	331-1/2
Longleaf-slash pine	Red (vermillion)	121	349
Loblolly-shortleaf pine	Lemon yellow	133	353-1/2
Oak-pine	Orange	171	324
Oak-hickory	Green	145	354
Oak-gum cypress	Olive green	143	325
Elm-ash-cottonwood	Sky blue	153	320
Maple-beech-birch	Light green	141	354-1/2
Aspen-birch	Blue	152	350

<sup>1/</sup> Government Printing Office, Standard Ink Sample Book, 1950.

7/ Dixon "Best" Colored Pencils, Assortment No. 110.

28.12 - Western

Cover type groups	Color	GPO ink	Crayon 2/
Douglas-fir	Olive green	142	325
Hemlock-Sitka spruce	Green	144	354
Redwood	Bright red	119	321
Ponderosa pine	Lemon yellow	132	353-1/2
White pine	Dark chrome	134	351-1/2
Lodgepole pine	Terra cotta	172	351
Larch	May green	147	356
Fir-spruce	Light green	148	354-1/2
Hardwoods	Azure	194	320-1/2
Chaparral	Grey	185	352-1/2
Pinyon-juniper	Black		331

<sup>1/</sup> Government Printing Office, Standard Ink Sample Book, 1950.
2/ Dixon "Best" Colored Pencils, Assortment No. 110.

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